



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/581,551

04/12/2007

Atsushi Miyawaki

P30056

5047

7055 7590 05/21/2010  
GREENBLUM & BERNSTEIN, P.L.C.  
1950 ROLAND CLARKE PLACE  
RESTON, VA 20191

EXAMINER

KIM, ALEXANDER D

ART UNIT

PAPER NUMBER

1656

NOTIFICATION DATE

DELIVERY MODE

05/21/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,551	<b>Applicant(s)</b> MIYAWAKI ET AL.	
	<b>Examiner</b> ALEXANDER D. KIM	<b>Art Unit</b> 1656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 1-3,5,6,8,9,12-17 and 19-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4,7,10,11 and 18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Application Status***

1. In response to the previous Office action, a non-Final rejection (mailed on 11/27/2009), Applicants filed a response and amendment received on 03/01/2010. In said amendment, claims 1-9, 18-27 and 36 are amended.

Claim 1-36 are pending. Claims 1-3, 5-6, 8-9, 12-17 and 19-36 are withdrawn from further consideration as non-elected inventions. The Examiner appreciate applicants' correct statement regarding the status of claims 35-36 (i.e., withdrawn) which were inadvertently omitted as part of withdrawn claim.

The claims will be examined only to the extent they read on the elected subject matter. Claims 4, 7, 10, 11 and 18 (in part) will be examined herein.

Instant rejection is non-final office action in view of new rejections shown below.

It is noted that claims 19-27 (i.e., withdrawn claims) is identified as "Withdrawn" wherein they should be identified as ---Withdrawn-Currently Amended---. For the interest of compact prosecution, elected claims will be examined without mailing the "Notice to Comply". The Examiner request applicants to recite correct claim status in the next response.

### ***Priority***

2. Applicants have noted that acknowledgement of foreign priority claim was not cited in the Office Action Summary. The Examiner regret any inconvenience. The

Art Unit: 1656

foreign priority claimed in the instant application has been acknowledged in the instant Office Action Summary.

It is noted that the nucleic acid of SEQ ID NO: 2 encoding the polypeptide comprising the amino acid of SEQ ID NO: 1 which is identical to the SEQ ID NO: 1 disclosed in foreign application JAPAN 2003-404472 (filed on 12/03/2003); thus, the priority date of instant SEQ ID NO: 1 is 12/03/2003. However, in view of no certified English translation(s) of the International Application No. PCT/JP04/18437, Japan 2003-404472 and Japan 2004-018344, the priority of claims having other limitation(s) (i.e., other than the nucleic acid encoding the polypeptide of SEQ ID NO: 1) is the date of instant application filing date which is 4/12/2007.

### ***Withdrawn-Claim Objections***

3. The previous objection of Claims 4, 7 and 18 (Claims 10 and 11 dependent therefrom) for reciting "to those of the protein having the amino acid sequence shown in SEQ ID NO: 1" which should be ---to the protein having the amino acid sequence shown in SEQ ID NO: 1---, is withdrawn by the applicants' amendment.

### ***Maintained-Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. The previous rejection of Claims 4, 7, 10, 11 and 18 under 35 U.S.C. § 112, first paragraph, **written description**, is maintained for the reasons set forth below.

Applicants argue that in view of instant amendment reciting "a deletion, substitution, and/or addition of 1 to 20 amino acids" in claims 4 and 18; and reciting "a deletion, substitution, and/or addition of 1 to 60 nucleotides" in claims 7 and 18; the instant rejection should be withdrawn.

Applicants' arguments have been fully considered but are not deemed persuasive for the following reasons. The examiner acknowledges the amendments as noted by applicants. However, because open terminology "comprising" in claims allows any additional mutations or changes in amino acids or nucleotides, instant claims includes, but not limited to only "a deletion, substitution, and/or addition of 1 to 20 amino acids" or "a deletion, substitution, and/or addition of 1 to 60 nucleotides"; thus, instant claims encompass any additional deletion, substitution, and/or addition in addition to the 1 to 20 amino acids changes; and in addition to the 1 to 60 nucleotides changes. Thus, for all the reasons above and reasons set forth in the previous office action mailed on 11/27/2009 (see pages 4-7), the instant rejection is maintained.

If it is applicants' intention to limit the changes of amino acid residues or nucleotide residues to the maximum of 20 or 60 residues, respectively, the Examiner suggest applicants to amend claims as shown below.

In claims 4 and 18, ---(b) a protein comprising the amino acid residues of SEQ ID NO: 1, except for only 1-20 amino acids deletion, substitution and/or addition, which has

orange fluorescence properties equivalent to the protein having the amino acid sequence set forth in SEQ ID NO: 1, which exists in the form of a monomer.---

In claims 7 and 18, ---(b) DNA comprising the nucleotide sequence of SEQ ID NO: 2, except for only 1-60 nucleotides deletion, substitution and/or addition, which has orange fluorescence properties equivalent to the protein encoded by the nucleotide sequence set forth in SEQ ID NO: 2, which exists in the form of a monomer.---

***Maintained and New-Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The previous rejection of Claims 4, 7, 10, 11 and 18 under 35 U.S.C. 102(b) as being anticipated by Timms-Wilson et al. (Journal of Microbiological Methods, 2001, Vol. 46, pages 77-80, as cited in PTO892 mailed on 11/27/2009), is maintained for reasons below.

Applicants argue that in view of instant amendment reciting "a deletion, substitution, and/or addition of 1 to 20 amino acids" in claims 4 and 18; and reciting "a deletion, substitution, and/or addition of 1 to 60 nucleotides" in claims 7 and 18; the instant rejection should be withdrawn.

Applicants' arguments have been fully considered but are not deemed persuasive for the following reasons. The examiner acknowledges the amendments as noted by applicants. However, because open terminology "comprising" in claims allows any additional mutations or changes in amino acids or nucleotides, instant claims includes, but not limited to only "a deletion, substitution, and/or addition of 1 to 20 amino acids" or "a deletion, substitution, and/or addition of 1 to 60 nucleotides"; thus, instant claims encompass any additional deletion, substitution, and/or addition in addition to the 1 to 20 amino acids changes; and in addition to the 1 to 60 nucleotides changes. Thus, for all the reasons above and reasons set forth in the previous office action mailed on 11/27/2009 (see pages 7-8), the instant rejection is maintained. To overcome instant rejection, the Examiner has suggested claim amendments above.

6. Claims 4, 7, 10, 11 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Karasawa et al. (Biochem. J., E. publication date of 4/5/2004, Vol. 381, pages 307-312, as cited in the IDS filed on 6/21/2007); or are rejected under 35 U.S.C. 102(a) if claim limitations are supported by the PCT/JP04/18437 but not in the Foreign Applications (i.e., Japan 2003-404472 and Japan 2004-018344).

As noted in the "Priority" above, the priority date of instant claims are filing date of instant application (i.e., 4/12/2007). The instant inventive entity is different from the authors of publication by Karasawa et al.; thus, it is considered as publication by other.

Karasawa et al. teach a nucleotide encoding the orange emitting fluorescent protein (FP) from *Fungia concinna* which is 100% identical to the instant SEQ ID NO: 1

Art Unit: 1656

which is encoded by the nucleotide as set forth in SEQ ID NO: 2 (see sequence alignment attached at the end of instant office action).

Karasawa et al. et al. teach a mutant FP from the SEQ ID NO: 1 having three amino acid substitutions to convert said FP to monomeric form (see the Abstract) by recombinant DNA technology and PCR driven random mutagenesis as described in "Experimental" (see right column, page 307 to top left column of page 308) which discloses using expression vector transforming into an E. coli; thus, meeting the limitations of claims 4, 7, 10, 11 and 18.

Instant rejection can be overcome by providing certified translation of all priority documents and providing the support of the instant limitations.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 4, 7, 10, 11 and 18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 7,541,451. Although the conflicting claims are not identical, they are not patentably distinct from each other for the reasons set forth below.

As noted above, because open terminology "comprising" in claims allows any additional mutations or changes in amino acids or nucleotides, instant claims includes, but not limited to only "a deletion, substitution, and/or addition of 1 to 20 amino acids" or "a deletion, substitution, and/or addition of 1 to 60 nucleotides"; thus, instant claims encompass any additional "deletion, substitution, and/or addition" in addition to the 1 to 20 amino acids changes; and in addition to the 1 to 60 nucleotides changes. Also, it is noted that polypeptide has to form monomer before become multimer.

The isolated DNA (the vector, the transformants and the kit thereof) encoding the polypeptide of SEQ ID NO: 1 (has 52 mismatch compared to instant SEQ ID NO: 1) anticipate instant DNA encoding the protein comprising (emphasis added) mutations which includes, but not limited to, 1-20 amino acids from SEQ ID NO: 1; or mutations which includes, but not limited to, 1-60 nucleotide (or the vector, the transformants and the kit containing claimed DNA thereof). Also the claims 1-8 of Patent No. 7,541,451 encompasses preferred embodiment of variant of nucleic acid encoding the mutant of polypeptide of SEQ ID NO: 1; for example, SEQ ID NO: 3 which has 22 substitutions compared to the instant SEQ ID NO: 1 which anticipates the instant claims 4, 10, 11

and 18. The Patent No. 7,226,993 also disclose the DNA as set forth in SEQ ID NO: 7 encoding fluorescent protein having 34 mismatch compared to the instant SEQ ID NO: 2 (see sequence alignment below); thus, anticipates instant claims 7 and 18.

8. Claims 4, 7, 10, 11 and 18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 7,226,993. Although the conflicting claims are not identical, they are not patentably distinct from each other for the reasons set forth below.

As noted above, because open terminology "comprising" in claims allows any additional mutations or changes in amino acids or nucleotides, instant claims includes, but not limited to only "a deletion, substitution, and/or addition of 1 to 20 amino acids" or "a deletion, substitution, and/or addition of 1 to 60 nucleotides"; thus, instant claims encompass any additional "deletion, substitution, and/or addition" in addition to the 1 to 20 amino acids changes; and in addition to the 1 to 60 nucleotides changes. Also, it is noted that polypeptide has to form monomer before become multimer.

The isolated DNA (the vector, the transformants and the kit thereof) encoding the polypeptide of SEQ ID NO: 3 (has 22 mismatch compared to instant SEQ ID NO: 1; see sequence alignment below) anticipate instant DNA encoding the protein comprising (emphasis added) mutations which includes, but not limited to, 1-20 amino acids from SEQ ID NO: 1; or mutations which includes, but not limited to, 1-60 nucleotide (or the vector, the transformants and the kit containing claimed DNA thereof). Also the claims 1-8 of Patent No. 7,226,993 encompasses variant having 11 amino acid mutations from

Art Unit: 1656

the SEQ ID NO: 3 (thus, encompasses 22-11= 11 mismatch, for example; and the vector, the transformants and the kit containing claimed DNA therefrom) anticipates the instant variant of nucleic acid encoding the mutant of polypeptide of SEQ ID NO: 1 consisting 1-20 amino acid substitution in instant claims 4, 10, 11 and 18. The Patent No. 7,226,993 also disclose the DNA as set forth in SEQ ID NO: 7 encoding fluorescent protein having 34 mismatch compared to the instant SEQ ID NO: 2 (see sequence alignment below); thus, anticipates instant claims 7 and 18.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander D. Kim whose telephone number is (571) 272-5266. The examiner can normally be reached on 10AM-6:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manjunath Rao can be reached on (571) 272-0939. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1656

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander D Kim/  
Examiner, Art Unit 1656

## Art Unit: 1656

## Sequence Alignment

RESULT 1 of SEQ ID NO: 2.rge.

AB128821

LOCUS AB128821 657 bp mRNA linear INV 26-JUN-2004

DEFINITION Fungia concinna mKO mRNA for fluorescent protein, complete cds.

ACCESSION AB128821

VERSION AB128821.1 GI:49257062

KEYWORDS .

SOURCE Verrillofungia concinna

ORGANISM Verrillofungia concinna

Eukaryota; Metazoa; Cnidaria; Anthozoa; Hexacorallia; Scleractinia;

Fungiina; Fungiidae; Verrillofungia.

REFERENCE 1

AUTHORS Karasawa,S., Araki,T., Nagai,T., Mizuno,H. and Miyawaki,A.

TITLE Cyan-emitting and orange-emitting fluorescent proteins as a donor/acceptor pair for fluorescence resonance energy transfer

JOURNAL Biochem. J. 381 (PT 1), 307-312 (2004)

PUBMED 15065984

REFERENCE 2 (bases 1 to 657)

AUTHORS Karasawa,S., Araki,T. and Miyawaki,A.

TITLE Direct Submission

JOURNAL Submitted (09-DEC-2003) Satoshi Karasawa, RIKEN Brain Science Institute, Laboratory for Cell Function and Dynamics; Hirosawa 2-1, Wako-shi, Saitama 351-0198, Japan (E-mail:kara@brain.riken.go.jp, Tel:81-48-462-1111(ex.7595))

FEATURES Location/Qualifiers

source 1. .657

/organism="Verrillofungia concinna"

/mol\_type="mRNA"

/db\_xref="taxon:496660"

gene 1. .657

/gene="mKO"

CDS 1. .657

/gene="mKO"

/codon\_start=1

/product="fluorescent protein"

/protein\_id="BAD24722.1"

/db\_xref="GI:49257063"

/translation="MVSVIKPEMKMRYMDGSGVNGHEFTIEGEGTGRPYEGHQEMTLR

VTMAKGGPMPFAFDLVSHVFCYGHRPFTKYPEEIPDYFKQAFPEGLSWERSLEFEDGG

SASVSAHISLRGNTFYHKSFTGVNFPADGPIMQNSVDWEPSTEKITASDGVKGDV

TMYLKLEGGGNHKCQFKTTYKAAKKILKMPGSHYISHRLVRKTEGNITELVEDAVAHS"

ORIGIN

Query Match 100.0%; Score 657; DB 7; Length 657;

Best Local Similarity 100.0%;

Matches 657; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```

Qy      1 ATGGTGAGTGTGATTAAACCAGAGATGAAGATGAGGTACTACATGGACGGCTCCGTCAAT 60
        |||
Db      1 ATGGTGAGTGTGATTAAACCAGAGATGAAGATGAGGTACTACATGGACGGCTCCGTCAAT 60

Qy     61 GGGCATGAGTTCACAATTGAAGGTGAAGGCACAGGCAGACCTTACGAGGGACATCAAGAG 120
        |||
Db     61 GGGCATGAGTTCACAATTGAAGGTGAAGGCACAGGCAGACCTTACGAGGGACATCAAGAG 120

Qy    121 ATGACACTACGCGTCACAATGGCCAAGGGCGGGCCAATGCCTTTCGCGTTTGACTTAGTG 180
        |||
Db    121 ATGACACTACGCGTCACAATGGCCAAGGGCGGGCCAATGCCTTTCGCGTTTGACTTAGTG 180

```

Art Unit: 1656

```
Qy      181 TCACACGTGTTCTGTTACGGCCACAGACCTTTTACTAAATATCCAGAAGAGATACCAGAC 240
         |||||||
Db      181 TCACACGTGTTCTGTTACGGCCACAGACCTTTTACTAAATATCCAGAAGAGATACCAGAC 240

Qy      241 TATTTCAAACAAGCATTTTCCTGAAGGCCTGTCATGGGAAAGGTCGTTGGAGTTCGAAGAT 300
         |||||||
Db      241 TATTTCAAACAAGCATTTTCCTGAAGGCCTGTCATGGGAAAGGTCGTTGGAGTTCGAAGAT 300

Qy      301 GGTGGGTCCGCTTCAGTCAGTGC GCATATAAGCCTTAGAGGAAACACCTTCTACCACAAA 360
         |||||||
Db      301 GGTGGGTCCGCTTCAGTCAGTGC GCATATAAGCCTTAGAGGAAACACCTTCTACCACAAA 360

Qy      361 TCCAAATTTACTGGGGTTAACTTTCTGCCGATGGTCCTATCATGCAAAACCAAAGTGTT 420
         |||||||
Db      361 TCCAAATTTACTGGGGTTAACTTTCTGCCGATGGTCCTATCATGCAAAACCAAAGTGTT 420

Qy      421 GATTGGGAGCCATCAACCGAGAAAATTACTGCCAGCGACGGAGTTCTGAAGGGTGATGTT 480
         |||||||
Db      421 GATTGGGAGCCATCAACCGAGAAAATTACTGCCAGCGACGGAGTTCTGAAGGGTGATGTT 480

Qy      481 ACGATGTACCTAAAACCTGAAGGAGGCGGCAATCACAATGCCAATTCAAGACTACTTAC 540
         |||||||
Db      481 ACGATGTACCTAAAACCTGAAGGAGGCGGCAATCACAATGCCAATTCAAGACTACTTAC 540

Qy      541 AAGGCGGCAAAAAAGATTCTTAAAATGCCAGGAAGCCATTACATCAGCCATCGCCTCGTC 600
         |||||||
Db      541 AAGGCGGCAAAAAAGATTCTTAAAATGCCAGGAAGCCATTACATCAGCCATCGCCTCGTC 600

Qy      601 AGGAAAACCGAAGGCAACATTACTGAGCTGGTAGAAGATGCAGTAGCTCATTCCTGA 657
         |||||||
Db      601 AGGAAAACCGAAGGCAACATTACTGAGCTGGTAGAAGATGCAGTAGCTCATTCCTGA 657
```

RESULT 1 from SEQ ID NO: 1.rup.

Q6I7B2\_FUNCO

ID Q6I7B2\_FUNCO Unreviewed; 218 AA.

AC Q6I7B2;

DT 19-JUL-2004, integrated into UniProtKB/TrEMBL.

DT 19-JUL-2004, sequence version 1.

DT 16-JUN-2009, entry version 19.

DE SubName: Full=Fluorescent protein;

GN Name=mKO;

OS *Fungia concinna* (Mushroom coral) (*Verrillofungia concinna*).

OC Eukaryota; Metazoa; Cnidaria; Anthozoa; Hexacorallia; Scleractinia;

OC Fungiina; Fungiidae; *Verrillofungia*.

OX NCBI\_TaxID=496660;

RN [1]

RP NUCLEOTIDE SEQUENCE.

RX PubMed=15065984;

RA **Karasawa** S., Araki T., Nagai T., Mizuno H., Miyawaki A.;

RT "Cyan-emitting and orange-emitting fluorescent proteins as a

RT donor/acceptor pair for fluorescence resonance energy transfer.";

RL Biochem. J. 381:307-312(2004).

CC

CC Copyrighted by the UniProt Consortium, see <http://www.uniprot.org/terms>

CC Distributed under the Creative Commons Attribution-NoDerivs License

CC

DR EMBL; AB128821; BAD24722.1; -; mRNA.

DR PDB; 2ZMU; X-ray; 1.65 A; A=1-218.

DR PDB; 2ZMW; X-ray; 2.00 A; A/B/C/D=1-218.

Art Unit: 1656

DR GO; GO:0008218; P:bioluminescence; IEA:InterPro.  
DR GO; GO:0006091; P:generation of precursor metabolites and energy; IEA:InterPro.  
DR GO; GO:0018298; P:protein-chromophore linkage; IEA:InterPro.  
DR InterPro; IPR011584; GFP\_related.  
DR InterPro; IPR000786; Green\_fluorescent\_prot.  
DR Pfam; PF01353; GFP; 1.  
DR PRINTS; PR01229; GFLUORESCENT.  
DR ProDom; PD013756; Green\_fl\_protein; 1.  
PE 1: Evidence at protein level;  
SQ SEQUENCE 218 AA: 24454 MW: 1A91DB996A4BF85D CRC64;

```
Query Match      100.0%;  Score 1172;  DB 2;  Length 218;
Best Local Similarity 100.0%;
Matches 218; Conservative 0; Mismatches 0; Indels 0; Gaps 0;
```

Qy	1	MVSVIKPEMKMRYMDGSGVNGHEFTIEEGTGRPYEGHQEMTLRVMTAKGGPMPFAFDLV 	60
Db	1	MVSVIKPEMKMRYMDGSGVNGHEFTIEEGTGRPYEGHQEMTLRVMTAKGGPMPFAFDLV 	60
Qy	61	SHVFCYGH RPFTKY PEEIPDYFK QAFPEGLSWERSLEFEDGGSASVSAHISLRGNTFYHK 	120
Db	61	SHVFCYGH RPFTKY PEEIPDYFK QAFPEGLSWERSLEFEDGGSASVSAHISLRGNTFYHK 	120
Qy	121	SKFTGVNFPADGPIMQNQSVDWE PSTEKITASD GVLKGDVTMYLKL EGGGNHKCQ FKTTY 	180
Db	121	SKFTGVNFPADGPIMQNQSVDWE PSTEKITASD GVLKGDVTMYLKL EGGGNHKCQ FKTTY 	180
Qy	181	KAAKKILKM PGSHYISHRLVRKT EG NITELVEDA VAHS 	218
Db	181	KAAKKILKM PGSHYISHRLVRKT EG NITELVEDA VAHS 	218

```

RESULT 7
US-11-739-133A-1
; Sequence 1, Application US/11739133A
; Patent No. 7541451
; GENERAL INFORMATION
; APPLICANT: MIYAWAKI, ATSUSHI
; APPLICANT: KARASAWA, SATOSHI
; TITLE OF INVENTION: FLUORESCENT PROTEIN
; FILE REFERENCE: P32000
; CURRENT APPLICATION NUMBER: US/11/739,133A
; CURRENT FILING DATE: 2007-04-24
; PRIOR APPLICATION NUMBER: 10/498,505
; PRIOR FILING DATE: 2004-11-22
; PRIOR APPLICATION NUMBER: PCT/JP02/13363
; PRIOR FILING DATE: 2002-12-20
; PRIOR APPLICATION NUMBER: JP 2001-387510
; PRIOR FILING DATE: 2001-12-20
; NUMBER OF SEQ ID NOS: 23
; SOFTWARE: PatentIn version 3.5
; SEQ ID NO 1
; LENGTH: 223
; TYPE: PRT
; ORGANISM: Fungia sp.
US-11-739-133A-1

```

Query Match 62.5%; Score 732.5; DB 3; Length 223;  
Best Local Similarity 63.4%;

Art Unit: 1656

	Matches	137;	Conservative	24;	Mismatches	52;	Indels	3;	Gaps	2;
Qy	2	VSVIKPEMKMRY	YMDG	SVNGHEFTTIEGEGTGR	PHYEGHQEMTLRVTMAKGG	MPFAFDLVS	61			
Db	1	MSVIKPEMKMKY	FMDG	SVNGHEFTVEGEGTGK	PHYEGKHKITLDVT--	KGGPLPFAFDLLS	58			
Qy	62	HVFCYGHRPFTK	YP	EEIPDYFKQAFPEGLS	WERSLEFEDGGSASVSAHISLR	GNTFYHKS	121			
Db	59	TVFSYGNRCLTK	Y	PDDIPDYFKQCFPGGY	SWERKFEFEDGGLAIAKAEISLR	GNCFEHKS	118			
Qy	122	KFTGVNFPADGP	IMQ	NQSVDEWPSTEKITASD	GVLGKGDVTMYLKLEGGGNH	KCQFKTTYK	181			
Db	119	TIEG-TFPDSSPI	AQNKT	LGWEPSTEKMTVRDGS	MSMGDDAAYLKLVG	GGNHKCYFTTTYT	177			
Qy	182	AAKILKMPGSHY	ISHRLVRKTEGNITEL	VEDAVAH	217					
Db	178	AKKKIPNLPOSH	FIGHRIS	SVVNGTKIGVME	DAIAH	213				

```

RESULT 2
US-11-739-133A-3
; Sequence 3, Application US/11739133A
; Patent No. 7541451
; GENERAL INFORMATION
; APPLICANT: MIYAWAKI, ATSUSHI
; APPLICANT: KARASAWA, SATOSHI
; TITLE OF INVENTION: FLUORESCENT PROTEIN
; FILE REFERENCE: P32000
; CURRENT APPLICATION NUMBER: US/11/739,133A
; CURRENT FILING DATE: 2007-04-24
; PRIOR APPLICATION NUMBER: 10/498,505
; PRIOR FILING DATE: 2004-11-22
; PRIOR APPLICATION NUMBER: PCT/JP02/13363
; PRIOR FILING DATE: 2002-12-20
; PRIOR APPLICATION NUMBER: JP 2001-387510
; PRIOR FILING DATE: 2001-12-20
; NUMBER OF SEQ ID NOS: 23
; SOFTWARE: PatentIn version 3.5
; SEQ ID NO 3
; LENGTH: 217
; TYPE: PRT
; ORGANISM: Fungia sp.
US-11-739-133A-3

```

[illegible]



Art Unit: 1656

Qy	365	AATTTACTGGGGTTAACTTTCCTGCCGATGGTCCTATCATGCAAAACCAAAGTGTTGATT	424
Db	362	AATTTGTTGGGGTTAACTTTCCTGCCGATGGTCCTGTGATGCAAAACCAAAGTTCTGATT	421
Qy	425	GGGAGCCATCAACCGAGAAAATTACTGCCAGCGACGGAGTTCTGAAGGGTGATGTTACGA	484
Db	422	GGGAGCCATCAACCGAGAAAATTACTACCTGCGACGGAGTTCTGAAGGGTGATGTTACGA	481
Qy	485	TGTACCTAAAAC TTGAAGGAGGCGGCAATCACAAATGCCAATTCAAGACTACTTACAAGG	544
Db	482	TGTTCCCTAAAGCTTGCGGGAGGCGGCAATCACAAATGCCAATTCAAGACTACTTACAAGG	541
Qy	545	CGGCAAAAAAGATTCTTAAAATGCCAGGAAGCCATTACATCAGCCATCGCCTCGTCAGGA	604
Db	542	CGGCAAAAAAGATTCTTAAAATGCCACAAAGCCATTCATCGGGCATCGCCTCGTCAGGA	601
Qy	605	AAACCGAAGGCAACATTACTGAGCTGGTAGAAGATGCAGTAGCTCATTCTGA	657
Db	602	AAACCGAAGGCAACATTACTGAGCTGGTAGAAGATGCAGTAGCTCATTGCTGA	654

RESULT 1 of SEQ 1,rai.

US-10-498-505A-3

; Sequence 3, Application US/10498505A

; Patent No. 7226993

; GENERAL INFORMATION:

; APPLICANT: MIYAWAKI, Atsushi

; APPLICANT: KARASAWA, Satoshi

; TITLE OF INVENTION: Fluorescent Protein

; FILE REFERENCE: P25481

; CURRENT APPLICATION NUMBER: US/10/498,505A

; CURRENT FILING DATE: 2004-06-18

; PRIOR APPLICATION NUMBER: PCT/JP02/13363

; PRIOR FILING DATE: 2002-12-20

```

; NUMBER OF SEQ ID NOS: 21

```

```
; SOFTWARE: PatentIn version 3.3
```

SEQ ID NO 3

; LENGTH: 217

; TYPE: PRT

; ORGANISM: Fungia sp.

US-10-498-505A-3

Query Match 91.1%; Score 1068; DB 3; Length 217;

Best Local Similarity 89.8%;

Matches 194; Conservative 11; Mismatches 11; Indels 0; Gaps 0;

Qy	2	VSVIKPEMKMRYIMDGSVNGHEFTIEGEGTGRPYEGHQEMTLRVTMAKGGPMPFAFDLVS	61
		:       : :       :     :	
Db	1	MSVIKPEMKMKYFMDGSVNGHEFTVEGEGTGKPYEGHQEMTLRVTMAKGGPMPFSFDLVS	60
Qy	62	HVFCYGHRPFPTKYPEEIPDYFKQAFPEGLSWERSLEFEDGGSASVSAHISLRGNTFYHKS	121
		:     :	
Db	61	HTFCYGHRPFPTKYPEEIPDYFKQAFPEGLSWERSLQFEDGGFAAVSAHISLRGNCFEHKS	120
Qy	122	KFTGVNFPADGPIMQNQSVDWEPSTEKITASDGLKGDVTMYLKLEGGNNHKCQFKTTYK	181
		:     :	
Db	121	KFGVNFPADGPVMNQSSDWEPSTEKITTCDGLKGDVTMFLKLAGGGNNHKCQFKTTYK	180

Art Unit: 1656

Qy 182 AAKKILKMPGSHYISHRLVRKTEGNITELVEDAVAH 217  
| | | | | | | | | | : | | | | | | | | | | | | | | | | |  
Db 181 AAKKILKMPOSFHFIGHRLVRKTEGNITELVEDAVAH 216

## RESULT 1

US-10-498-505A-7

; Sequence 7, Application US/10498505A

; Patent No. **7226993**

; GENERAL INFORMATION:

; APPLICANT: MIYAWAKI, Atsushi

; APPLICANT: KARASAWA, Satoshi

; TITLE OF INVENTION: Fluorescent Protein

; FILE REFERENCE: P25481

; CURRENT APPLICATION NUMBER: US/10/498,505A

; CURRENT FILING DATE: 2004-06-18

; PRIOR APPLICATION NUMBER: PCT/JP02/13363

; PRIOR FILING DATE: 2002-12-20

; NUMBER OF SEQ ID NOS: 21

```
; SOFTWARE: PatentIn version 3.3
```

; SEQ ID NO 7

; LENGTH: 654

; TYPE: DNA

; ORGANISM: Fungia sp.

US-10-498-505A-7

Query Match 91.1%; Score 598.6; DB 5; Length 654;  
Best Local Similarity 94.8%;  
Matches 619; Conservative 0; Mismatches 34; Indels 0; Gaps 0;

Qy	5	TGAGTGTGATTAAACCGAGATGAAGATGAGGTACTACATGGACGGCTCCGTCAATGGGC	64
Db	2		
		TGAGTGTGATTAAACCGAGATGAAGATGAAGTACTTCATGGACGGATCCGTCAATGGGC	61
Qy	65	ATGAGTTCACAATTGAAGGTGAAGGCACAGGCAGACCTTACGAGGGACATCAAGAGATGA	124
Db	62		
		ATGAGTTCACAGTTGAAGGTGAAGGCACAGGCAAAACCTTACGAGGGACATCAAGAGATGA	121
Qy	125	CACTACGCGTCACAATGGCCAAGGGCGGGCCAATGCCTTTTCGCGTTTGA	184
Db	122		
		CACTACGCGTCACAATGGCCAAGGGCGGGCCAATGCCTTTCTCGTTTGA	181
Qy	185	ACGTGTTCTGTTACGGCCACAGACCTTTTACTAAATATCCAGAAGAGATACCAGACTATT	244
Db	182		
		ACACGTCTCTGTTACGGCCACAGACCTTTTACTAAATATCCAGAAGAGATACCAGACTATT	241
Qy	245	TCAAACAAGCATTTCCTGAAGGCCTGTCATGGGAAAGGTCGTTGGAGTTCGAAGATGGTG	304
Db	242		
		TCAAACAAGCATTTCCTGAAGGCCTGTCATGGGAAAGGTCGTTGCAGTTCGAAGATGGTG	301
Qy	305	GGTCCGCTTCAGTCAGTGCGCATATAAGCCTTAGAGGAAACACCTTCTACCACAAATCCA	364
Db	302		
		GGTTTGCTGCAGTCAGTGCGCATATAAGCCTTAGAGGAAACTGCTTCGAGCACAAATCCA	361
Qy	365	AATTTACTGGGGTTAACTTTTCCTGCCGATGGTCCTATCATGCAAAACCAAAGTGTTGATT	424
Db	362		
		AATTTGTTGGGGTTAACTTTTCCTGCCGATGGTCCTGTGATGCAAAACCAAAGTTCTGATT	421
Qy	425	GGGAGCCATCAACCGAGAAAATTACTGCCAGCGACGGAGTTCTGAAGGGTGATGTTACGA	484
Db	422		
		GGGAGCCATCAACCGAGAAAATTACTACCTGCCAGCGAGTTCTGAAGGGTGATGTTACGA	481

[illegible]